

Green Routes Bicycle Network Plan

Brookline Bicycle Advisory Committee

November 10, 2008

Updated: January 2012, February 2013, January 2014, January 2015, January 2016, January 2017

1. Vision for a Bicycle Friendly Community

Bicycling is a sustainable, economical, and convenient mode of transportation for short and medium distance trips and is a popular form of recreation for young and old. Bicycling is good for the environment, for public health, and for reducing traffic congestion and parking demand. It offers older children a measure of independence and is a practical mode of travel to Brookline High School, sports fields, and other local destinations.

Brookline already has many conditions conducive to bicycling – compact development, proximity to major employment centers, relatively flat topography, and a temperate climate. At 4% of commuter trips made by bicycle (US Census, 2010), Brookline’s percentage has increased from 1.5% since 2000. Bicycle counts conducted during rush hour on one weekday each September since 2008 show more than 1,000 bicyclists per hour passing major checkpoints, including more than 100 people riding daily to Brookline High School. A survey indicated 70 bicycles parked around Coolidge Corner at mid-day on one September Saturday.

Beacon, Harvard, Washington, and Carlton Streets are major connectors for cyclists traveling from Brookline and Newton to Kenmore Square and downtown Boston, across Brookline, and between Jamaica Plain and Brighton. Boston has made a strong commitment to improving conditions for cyclists and has made major strides in recent years toward this goal.

Brookline’s notable improvements in bicycle facilities and accommodations in recent years include more bike racks in commercial areas, additional bike lanes and shared lane markings on Longwood Avenue, Washington Street and elsewhere, contraflow lanes and cycle tracks on Netherlands and Parkway Roads, and institution of a \$50 fine for vehicles blocking bike lanes.

Brookline installed three bike-sharing stations in 2012 following the successful 2011 launch of the Hubway Bike Sharing Program in Boston. A fourth station was installed in 2013.

However, bicycle use in Brookline remains well below its potential. For most residents, getting outside one’s immediate neighborhood requires negotiating heavily trafficked streets, resulting in a level of stress and danger that many people – especially less experienced cyclists – prefer to avoid. Every community with high bicycle use, whether in the Netherlands, Denmark, Davis (CA), Portland (OR) or Boulder (CO), offers an extensive *network of bike routes with low traffic stress*.

Brookline’s quiet local streets are ideal for bicycling, but they are not connected in a network that facilitates cross-town travel. Even the town’s few dedicated bicycle facilities subject cyclists to high traffic stress. The bicycle lanes on Beacon Street disappear at intervals, leaving cyclists in heavy traffic, particularly at intersections. Bike lanes often occupy the “door zone” of high turnover parking lanes. Thus, even recent improvements to bicycle facilities must be viewed as transitional, with further improvements needed to make them truly safe and low stress. Double parking is also a problem as it blocks bike lanes and forces cyclists to

stop abruptly or swerve into traffic. The Charles River bicycle path is just a few hundred feet from Essex Street in Brookline, but the dangerous crossings approaching Commonwealth Avenue renders it practically inaccessible to many.

“Brookline Complete Streets Policy” was adopted by the Board of Selectmen in 2016 and states:

The Town of Brookline shall plan, construct, and maintain its public ways to enhance safety, access, inclusion, convenience and comfort for all users, thereby creating “complete streets.” The Town will create a comprehensive transportation network that sufficiently accommodates people of all ages and abilities, whether traveling by foot, bicycle, wheelchair, mass transit, or motor vehicle.

...the Town’s transportation projects shall be designed and implemented to provide safe and comfortable access for healthful transportation choices such as walking, bicycling, and mass transit. The needs and safety of the town’s most vulnerable users shall be given special consideration during project planning. Users may be considered vulnerable by virtue of their mode of transportation, such as bicycling or walking, or because of their age or ability....

Brookline’s favorable urban structure offers the potential to create the network of low traffic stress and “green” bicycle routes that its citizens want. Other communities’ experiences suggest that Brookline can have 5 to 10% of its trips being made by bicycle within a few years. Young people will routinely cycle to school and to athletic fields for games and practice. Residents will shop and run errands by bicycle, reducing motor vehicle traffic and parking demand. New greenways will better connect South Brookline to the rest of town, a boon to walkers, joggers, and bicyclists alike. Families will enjoy riding along Brookline’s green routes, with easy access to the Town’s open spaces and to regional paths. More adults will bicycle to work and to do errands, getting the exercise and fresh air they need while saving money, enjoying their commute, and contributing to a sustainable environment. Safe routes to Green Line T stops, three of which have nearby Hubway bike share stations and many of which have bike racks, could help to encourage combining cycling and transit use.

Creating this network of green routes requires deliberate planning, budgeting, and refocused priorities. Some of the network can be created at minimal capital expense using road markings and traffic management changes such as parking restrictions. Other parts of the network will require modest capital improvements such as curb ramps and extensions. Some streets, notably in South Brookline and along the town’s busiest thoroughfares, will require major new infrastructure, likely requiring state or federal funding. With reasonable aid infusions for five large projects, most of the Green Routes Bicycle Network could be accomplished within 10 years.

This remainder of this master plan is organized into the following sections:

- 🚲 Section 2: Network plan
- 🚲 Section 3: Roadway treatments
- 🚲 Section 4: Signage and Pavement Markings
- 🚲 Section 5: Bicycle Accommodations: General Comments
- 🚲 Section 6: Priorities
- 🚲 Section 7: Street List of Proposed Projects
- 🚲 Section 8: Projects Approved/Awaiting Funding
- 🚲 Section 9: Projects Funded/Awaiting Construction
- 🚲 Section 10: Completed Projects

- 🚲 References
- 🚲 Appendices

This master plan should be complemented by other Town efforts to improve conditions for cycling, including provisions for bicycle parking, safety education, traffic law enforcement, and ensuring that every street project undertaken or permitted by the Department of Public Works includes reasonable accommodation of bicyclists and pedestrians. The network evolution should be coordinated with regional plans including those for Boston, Newton, and Cambridge to maximize its benefit to the entire region.

2. Network Plan

Bicyclists are permitted to use every street in Brookline, from small residential streets to Route 9. Therefore, every street should be made safe and accessible to bicyclists, and bicycle accommodations should be considered whenever road work is done.

For the Town to plan and implement bicycle-related safety improvements, the BAC has designed a *Green Routes Bicycle Network* of safe, pleasant, and connecting routes. The network connects neighborhoods with important local destinations including the high school, libraries, parks, and commercial districts; it also connects to Green Line T stops and to important bicycling routes at the Town limits, including Beacon Street in Boston and Newton, Commonwealth Avenue, Perkins Street, West Roxbury Parkway, and the Charles River bike paths. The Network avoids circuitous routes that discourage cycling. As much as possible, its routes minimize traffic stress, avoid hills, are esthetically pleasant, and minimize stops. It incorporates routes that cyclists prefer, because there is no benefit to designating routes that bicyclists won't follow.

The network's framework is comprised of routes that traverse the Town—roughly north-south and east-west. A second level of connecting streets provides access to and from these major routes, to the Town's neighborhoods and key destinations such as schools and parks. The major cross town routes are listed below.

- **Beacon Street** crosses the most densely populated part of Brookline from the edge of Brighton and Newton to Boston's bike lanes leading into Kenmore Square and downtown Boston. This is a high-traffic route for motor vehicles and bicyclists alike.
- **The "D-line" route** is a less traffic-intense east-west route that roughly follows the D-line trolley. It uses the Muddy River path, Netherlands, Aspinwall, Kent, Davis, Greenough, Sumner, Clark, Clinton, Eliot, Cleveland, Reservoir, Middlesex, Hammond, and Heath Streets.
- **South of Route 9** is a cross town route along Dudley and Walnut Streets, Route 9, and the Muddy River path.
- **Harvard Street** crosses town from Brookline Village to Allston/Brighton.
- **Washington Street** crosses town from Brookline Village through Washington Square to Brighton.
- **The South Brookline** route includes Newton Street, West Roxbury Parkway, Hammond Street, Clyde and Lee Streets. The more densely-populated part of South Brookline is separated from North Brookline by the large open space (without any through streets) comprised of the Country Club, Putterham Meadows Golf Course, Dana Park, and Pine Manor College. The network skirts this open space on all sides. This circuit of the open space also offers the opportunity for a greenway for

bicyclists and pedestrians that would be both a recreational resource for this part of Brookline and an access route between South Brookline and North Brookline as well as Boston and Newton.

- **Route 9** crosses town from Chestnut Hill in the west to Brookline Village and the Jamaicaaway in the east. With the planned protected bike lanes on Washington Street (Route 9) that is part of the Gateway East project, Route 9 becomes an important connector, and extending protected lanes further west would further enhance its use as a bicycle route.

Roadway treatments are described in the next section. Priorities for completing the network are listed in Section 6, and detailed recommendations for individual streets are listed alphabetically by street name in Section 7.

3. Roadway Treatments

The network may be divided into four levels:

- *Level One: Off-road paths* such as the Muddy River/Emerald Necklace Path (shown in the photo at right).
- *Level Two: Slow traffic streets.* Much of the bicycle network follows low speed streets where parking turnover is minimal. Where traffic volumes are low, bicycles can share space with motor traffic; where traffic volumes are higher, bicyclists should be offered accommodations such as those described below. On the Green Routes Network map (Appendix A), some of these streets are shown as “connecting routes” that link streets with bicycle accommodations or link Brookline streets to town borders.



Traffic calmed streets are a special case of slow traffic streets. These are streets where special measures have been taken to slow traffic for the safety of pedestrians, using such measures as speed humps, speed tables, raised crosswalks, raised intersections, median refuges and bulb-outs. These can be excellent streets for cyclists as well. However, care should be taken in designing such pedestrian safety measures so that they do not increase risks for cyclists or preclude later additions of bicycle accommodations.

- *Level Three: Greenways.* Because it lacks a dense street grid, many bicycle routes in South Brookline must follow arteries carrying high speed motor traffic. Physically separate facilities offer the best and safest alternative for bicycle accommodations in this environment, and can often be achieved by means of “road diets” that reduce pavement, decrease storm water runoff, and permit development of tree-lined greenways that benefit both pedestrians and cyclists. This part of the network requires extensive roadway changes, entailing considerable expense and planning effort. A successful example of this approach is the Leverett Pond bike path, where a street was converted to a bike path, diverting motor traffic to the parallel Pond Avenue and providing separate paths for pedestrians and cyclists.
- *Level Four: Main streets.* Beacon Street, Harvard Street, Washington Street (which joins Route 9) and Route 9 are Brookline’s main streets that carry through traffic and host busy commercial centers with high turnover parking. These functions make it challenging to devote more roadway space to bicycles. But at the same time, they make these streets the most important to improve for safe and low stress bicycling.

Although some bicyclists mix comfortably with moderate speed motor traffic, the majority of the bicycling (or potential bicycling) population is “traffic-intolerant”: people who can follow the rules of the road, and who don’t mind riding on low-speed, low-traffic local streets, but who elsewhere want to be separated from the stress of sharing space with motor traffic. The *Green Routes Bicycle Network* aims to accommodate traffic-intolerant cyclists by offering the separation from traffic that they need, using a variety of designs. In addition to off-road paths such as the Muddy River/Emerald Necklace path and directing cyclists along residential streets with low traffic volumes and speeds, the *Green Routes Bicycle Network* includes the following roadway treatments.

- 🚲 **Bike lanes** designate exclusive space for bicyclists. Lanes are appropriate on moderate speed streets with low turbulence, i.e., without high turnover parking lanes and intersection approaches with heavy right turning traffic. Where there is parallel parking, bike lanes must be wide enough and adequately engineered to discourage bicyclists from riding in the “door zone,” the area where opening vehicle doors can create a significant hazard to cyclists. Bike lanes that terminate abruptly, for example to make space for a turning lane, make roads unaccommodating for most bicyclists.
- 🚲 **Buffered bike lanes** are bike lanes separated from the adjacent vehicle travel lane and/or parking lane by a buffer lane of some width—usually designated by striped painted lines in the buffer area. Buffers increase cyclists’ safety by designating an area adjacent to a bike lane to highlight safe door opening area and/or vehicle passing distance.
- 🚲 **Bicycle priority lanes** are shared travel lanes (bike and motor vehicle) with “bicycle zone” indicated by roadway markings. These lanes are appropriate for streets with speeds up to 30 mph. Shared lane arrows (“sharrows”) have been marked on streets in many cities, including Cambridge and Montreal. In Brookline, sharrows are in use on Longwood Avenue and Washington Street, for example. Markings that delineate a bicycle priority zone allow cyclists to travel more confidently on streets where a full bike lane is impractical.
- 🚲 **Bike boxes.** A bike box is a marked queuing area for bikes between the stop line and the crosswalk at a signalized intersection. Bike boxes improve safety by putting stopped bikes ahead of cars or providing suggested two-stage left turns for bicyclists. Setting the motor vehicle stop line back from the intersection also improves pedestrian comfort and visibility.
- 🚲 **Contraflow lanes** allow two-way bicycle traffic on streets designated as one-way for motor traffic. On a contraflow street, all traffic stays to the right of a “center” line; however, the lane in the contraflow direction is narrow because only bikes are permitted in that direction. “One Way” and “Do Not Enter” signs on such streets require a supplementary plaque on “Do Not Enter” signs: “Except Bicycles.”

In Brookline, one-way restrictions are often applied to keep through traffic off residential streets, making those streets ideal for contraflow bicycling. In many situations, contraflow offers bicyclists safer and more direct routes. Contraflow has an excellent safety record in Europe and America. Cambridge has four contraflow sections; Provincetown has two-way bicycling and one-way motor traffic all along Commercial Street, its principal thoroughfare. Several of Brookline’s one-way streets already carry considerable contraflow bicycle traffic. Formally designating such streets two-way for bicycles using signs and markings should improve safety as it raises motorist expectations of finding opposing bicycle traffic. Contraflow lanes were implemented on Netherlands and Parkway Roads and have been used successfully since 2009. Formal designation is necessary before any route with contraflow can be marked with signs or on a map; it is also a powerful way of indicating that bikes are intended users of our streets.
- 🚲 **One-Way Streets with end-marked bike contraflow:** One-way streets often offer cyclists quiet connections or routes around busy streets and intersections. In northern Europe,

cyclists are permitted to bike against the one-way flow of traffic on low volume one-way streets without the formality of a painted lane. Signs are used at the beginning and end of the street: on the “no entry” end, an additional sign is added—“except bicycles.” On the other end, a sign is added to alert drivers to “Expect two-way bicycle traffic.” A pilot of such road use might be tried on three to six streets, where motor traffic is already low volume and low speed, and residents favor participating. Candidate streets include Abbottsford, Beals, Coolidge, Crowninshield, Egmont, Fuller, Green and Thorndike, among others.

🚲 ***No passing bicycles zones*** are appropriate on short sections of streets that are too narrow for a car to pass a bike without crossing the center line, and where crossing the center line is dangerous because of frequent intersections or limited sight distance. One example is Carlton Street southbound from Beacon Street, where motorists frequently squeeze past bicyclists with little clearance, and often drive on the wrong side of the road as they approach the sharp turn onto Colchester Street. Another example is on curved sections of Heath Street. A posted passing restriction encourages bicyclists to ride at a safe distance from the curb, making the restriction self-enforcing, and relieving motorists of the stress of seeking an opportunity to pass when it isn’t safe to do so.

🚲 ***Road diets (pavement reductions)*** reduce the number of lanes on a road, usually to one in each direction, plus short extra lanes where needed for capacity at intersections. Candidates include Lee and Clyde Streets, Hammond Street, and Newton Street and West Roxbury Parkway bordering the Putterham Golf Course. The reclaimed space can be used to create greenways with tree lawns and shared use paths, benefitting both pedestrians and cyclists.

🚲 ***Cycle tracks or protected bike lanes*** are parallel to a road but are physically separated from motor traffic lanes by a curb or buffer. They are the most common bicycle accommodation in the Netherlands and Denmark, countries that have set the standard for high levels of bicycle use and safety. Increasingly, they are seen in the United States as necessary to make the busiest streets safe and low stress for bicycling.

One-way paths lying on either side of the road, as on Vassar Street in Cambridge, work well in many situations. Two-way paths, as on Memorial Drive, may be preferred on roads with few intersections and where safe transitions at path endpoints and intersections can be provided.

Normally, roadside bike paths are distinct from the sidewalk. However, in a park or greenway, they can be shared space. Sections of a bike path can also be shared with automobiles if limited to a driveway function (access to a few homes) and engineered for driveway speeds.

🚲 ***Intersections*** are the most dangerous locations for all road users and the sites of many crashes. For the safety of cyclists, it is important to continue bicycle lanes through intersections and sometimes paint them green to alert motorists (particularly turning motorists) of the presence of bicyclists. Bike boxes can also be useful, particularly at signalized intersections. Bike boxes, usually painted green, are designated areas at the front of a traffic lane that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase, so that they are visible to advancing or turning traffic.

🚲 ***Detours during construction:*** At construction sites that block normal sidewalks and bicycle paths, safe accommodations for walkers and cyclists should be provided around the blockage.

4. Signage and Pavement Markings

Wayfinding Signage

One of the important elements of the *Green Routes* plan is wayfinding signage. Wayfinding for cyclists provides information on distances/directions to key locations, and the optimal cycling routes to those destinations. This should be a resource for those in Brookline and those biking through Brookline:

- **Brookline example:** Coolidge Corner, 1 mile.
- **Commuting example:** Best routes to downtown, river, Longwood Medical Area, with signs, arrows, distances

An additional benefit of wayfinding is that it increases awareness for automobile drivers as well. When they see a cycle/wayfinding sign, they see that this is a cycling route/corridor/bicycling friendly road, which is likely to have benefits for awareness and safety. The signs also communicate that this is a bicycling aware/friendly community.

Compared to other cities, Brookline and Boston have very little in the way of wayfinding signage. On the Riverway/Olmsted park path, for example, there is not one sign that says “this way to destination X” (Fenway, Jamaica Pond, MFA, etc.), or “path continues over there.”



Cambridge, MA

Things have started to get better, as the pictures indicate. In downtown Boston, there is a pilot bicycle wayfinding program underway. A similar program has started in Cambridge, with some signage pointing to Alewife T Station, Harvard Square, and so on. We could do better in Brookline. For example, with all the work going on at River St./Washington St., it would be useful to include wayfinding as part of that project (this way to Fenway, that way to Jamaica Pond, etc.).



Downtown Boston

We recommend three things as part of the *Green Routes Plan*:

- Improved signage and wayfinding to destinations in Brookline (i.e. Coolidge Corner), and commuting corridors (to downtown, Medical area, River, etc.) – focused on best routes and distances
- Wayfinding should be destination oriented but also best route oriented (i.e., where there are bike lanes and markers)
- Signage should be large enough to be visible to cyclists and to drivers as well to create awareness.

Besides guiding cyclists, destination signs advertise the Town's bike routes, tourist sites, and commercial areas, promoting bicycling and bicycle tourism. They also convey to motorists and cyclists alike the message that our society supports bicycling.

Portland, Oregon



Other Bicycle Signage

Other bicycle specific signs and pavement markings may include “sharrows” (see explanation below), “bikes may use full lane,” and “except bicycles” (where bicycles are permitted to make maneuvers or enter areas not permitted for motorists). Green paint can be used to highlight bike areas, particularly at intersections. Another way to guide cyclists is to mark the pavement with a double chevron (>>) on intersection approaches, tilting the chevrons to the right where the bike route turns. This kind of marking, used in Brussels, is especially valuable on bike routes that follow side streets.



Sharrows

Shared lane markings (“sharrows”) indicate where cyclists should ride in a shared travel lane to be safe from opening doors on parked cars or other hazards. Motorists drive as normal in a shared lane when no cyclists are present; when cyclists are present, motorists should slow down and pass with care, at a safe distance, and only when it can be done without endangering the cyclist or oncoming traffic.



Except Bikes

This sign indicates that bicyclists may turn right (from Harvard Street to Washington Street in Brookline Village), when cars are prohibited from doing so. Other “Except Bikes” signs may indicate that bicycles are permitted to make maneuvers or enter areas not permitted for motorists, such as traveling both ways on a street restricted to one-way motorist traffic, such as the example at Netherlands Road and Parkway at right.





Change lanes to pass

This sign reminds motorists to pass cyclists at a safe distance by changing lanes.

Share the Road

Share the road signs are generally not considered to be useful; this one may be the best one to use—if any.



Walk your bike

“Walk your bike” signs have been installed in Brookline’s commercial areas to remind cyclists to walk their bikes on sidewalks in business districts.

5. Bicycle Accommodations: General Comments

Bicycle Friendly Community Status: Moving from Bronze to Silver

In the spring of 2016 Brookline received a bronze Bicycle Friendly Community designation from the national League of American Bicyclists. The report card that accompanied the designation shows how Brookline matches up to national standards of bike friendliness and indicates key steps toward the next level. See Appendix B.



Replacement/Maintenance of Bicycle Accommodations

Once put in place, bicycle accommodations on Brookline’s streets need to be adequately maintained. Whether in the form of painted lines, stencils, bollards, curbs, or other means of providing safety for cyclists sharing roads with vehicular traffic, it is essential that these accommodations be promptly replaced or maintained when damaged or removed by road/construction projects or by regular wear and tear. Monitoring of utility and other construction work should assure that trenches or other pavement cuttings do not leave dangerous ridges in bike lanes. It is also important that bike lanes be kept clear of overhanging vegetation, debris and snow.

Brook-on-Line is a useful method for reporting problems that need to be addressed by various Town Departments; however, new categories directly related to bicycle issues on the site would be useful.

Filling in Gaps in the Green Routes Network

Brookline has added a number of bicycle accommodations in recent years, and streets with those accommodations are seeing a gradual increase in bicycle traffic. For bicycling to become a truly safe and viable form of transportation within and across town, it is important that both large and small gaps in the network be filled in, otherwise it is not a network. Bicycle lanes that disappear at

intersections (the most dangerous place for all road users) or that start and stop along a major road as they do on Harvard Street, do not offer safe, continuous routes that most bicyclists will feel safe using. Major gaps are delineated in the street list and map of the network (Appendix A), but it should be noted that there are also small gaps that need to be filled to knit together safe, continuous bike routes. A few examples:

- Safe crossing of Netherlands Road between Parkway Road and the Muddy River Path
- Multiple interruptions of the bike lanes along the length of Harvard Street, where bike lanes repeatedly turn into shared bicycle/vehicle lanes
- Beacon Street outbound from Pleasant Street to Marion Street
- Washington Street, where bike lanes turn into shared bicycle/vehicle lanes, e.g., northbound from the Main Library exit drive to School Street or near and across the intersection with Beacon Street

Improvement of Bicycle Accommodations

For bicycling to become a truly safe and viable form of transportation within and across town for persons of all ages and abilities, it is also important to continue improving existing bicycle accommodations, especially on busy streets. For example, some bike lanes need to be widened, buffered or physically protected to reduce the perceived and real risk of crashes such as dooring. Other examples include upgrading sharrows to bike lanes.

Projects to implement Brookline's *Green Routes Bicycle Network* are presented below in various categories: **Priorities** highlight projects that connect various parts of the network and various parts of the town to increase safety and comfort for travel among and to educational, recreational, governmental and commercial destinations. The **street list** provides detailed explanations and rationales for individual projects by street. Streets are listed alphabetically to facilitate incorporation of bike accommodations into ongoing street rehabilitation, repaving or rebuilding. **Projects approved/awaiting funding** have been reviewed and approved by the Transportation Board. **Projects funded/awaiting construction** are already scheduled for completion, although some may be delayed because of factors such as concurrent utility or road work in the area. Finally, **completed projects** highlight those projects that have been completed since the *Green Routes* plan was developed in 2008; this is both a celebration of accomplishment and a convenient reference to assist in developing new projects or making further upgrades.

The 2008 plan anticipated the Town increasing bicycle project funding from zero to \$110,000 per year, which amounts to \$2 per resident per year. In some cases, state and federal aid may be available for more expensive projects. Small sidewalk repair, signage, and marking projects can be implemented within the Town's normal maintenance program.

Designs presented below are conceptual; each project requires engineering study and design by the Department of Public Works, review by the Transportation Board at their public meetings, and identification of funding.

6. Priorities

Projects that contribute to a safe cycling network throughout Brookline are assigned the highest priority. Routes to schools, parks, business districts and other frequently visited destinations that connect existing paths, bike lanes and quiet streets are assigned a high priority. Completing bike routes on major streets that are heavily used by commuting or shopping cyclists—such as Beacon Street, Harvard Street, and Longwood

Avenue—are also high priority. When reviewing projects on one street, attention should be given to intersecting streets to ensure connectivity within the network. The priority list highlights comprehensive projects, but also lists in boldface individual streets/intersections that could be handled as stand-alone projects that would eventually contribute to the entire network. The priority list also includes treatments that are relatively new to Brookline and deserve pilot projects that may lead to more extensive use of the treatment.

As noted in the introduction, bicyclists are entitled to use all streets in Brookline. Whenever changes or improvements in roads are planned, consideration should be given to bicycle and pedestrian safety and convenience, in particular:

- All traffic signals should either be on a regular cycle that provides opportunities for all road users to cross in all directions OR sensors should be set in such a way that they can be triggered by a cyclist in the road.
 - Cyclists should be permitted to cross streets with advance pedestrian walk signs, as long as doing so does not endanger pedestrians.
 - Street lights should be adequate (and appropriately aimed) on all streets to make the right of way visible to pedestrians and cyclists.
 - Changes such as bulb outs that force cyclists to temporarily merge with motor traffic should be avoided.
1. **Muddy River Route**—Reconnect all sections of the Emerald Necklace from the Carlton Street Footbridge to Jamaica Pond, including safe crossings at **Brookline Avenue, River Road, Route 9/Boylston Street**, and **Parkway Road**. In 2011-12, the Selectmen’s Committee on Emerald Necklace Bicycle and Pedestrian Crossings reviewed and designed new crossings at these locations with help from staff and consultants. A member of the Bicycle Advisory Committee served on the committee. The draft plan has been presented to the Board of Selectmen.
 2. **Coolidge Corner**: Incorporate recommendations of the “Bicycle and Pedestrian Infrastructure Assessments, Brookline, MA Harvard Street Corridor: Longwood Avenue to Shailer Street” (see Appendix C.) This report was prepared through the cooperation of the Massachusetts Department of Transportation, Walk Boston and Mass Bike. Its goal was to study this section of Coolidge Corner and make recommendations to improve pedestrian and bicyclist safety and convenience.
 3. **Beacon Street**—Improvements to safety for bicyclists along Beacon Street and access points such as **Park Street** are very important. This is a heavily used bicycle route and provides access to local commercial districts. Section 7 details the sections of Beacon Street that are part of this project.
 4. **Harvard Street**—Improvements to safety for bicyclists along Harvard Street are very important. This is a heavily used cross-town bicycle route and provides access to local commercial districts and schools. Section 7 details sections of Harvard Street that are part of this project.
 5. **Washington Street**—This is an important route through Brookline and connects Brookline Village and Washington Square. Bicycle safety improvements along the length of the street have been initiated in the form of bicycle lanes and shared lanes, but further improvement is needed and is detailed below.
 6. **Greenways in South Brookline** include **Lee/Clyde Streets, Newton Street, West Roxbury Parkway** and **Hammond Street**. These projects would substantially improve access between South Brookline and North Brookline as well as improving recreational options for cyclists and pedestrians throughout South Brookline. The greenway proposal is a major undertaking, but segments could be built as individual projects, along with improvements to streets and intersections such as **Dudley Street**,

Walnut Street, Heath Street, and Chestnut Hill Avenue. Each change would improve the bicycling environment.

7. **Bicycle Parking** is essential to making it convenient to use bicycles for transportation. Single and multiple use racks have been installed in many locations around Brookline, but additional bike parking is needed. “Hitching posts” installed on parking meters (and parking meters themselves) are useful for bicycle parking. Town residents have noted a need for additional bike parking at such locations as Town Hall, the Public Safety Building on Washington Street, the small commercial area at Washington and School/Cypress Streets, at schools and parks, and in some residential areas where there are no parking meters and few sign posts available to secure bicycles. Seasonal bike corrals are successfully installed each year in Cambridge and Somerville and one was installed in Coolidge Corner in 2016.



**Seasonal Bike Corral on Harvard Street in Coolidge Corner
Saturday, October 8, 1 PM**

7. Street List of Projects

Projects are listed below alphabetically by street name. Asterisks highlight projects and intersections that are particularly important and/or dangerous as currently configured. These should have high priority for reconfiguration, repair, or other appropriate attention. As noted in the introduction, bicyclists are entitled to use all streets in Brookline. Whenever changes or improvements in roads are planned, consideration should be given to bicycle and pedestrian safety in accordance with the “Brookline Complete Streets Policy.” Specific concerns are noted in section 6 above and in the street list below.

***Babcock Street:** Since the plans for the I-90 Allston/ West Station project call for a bike and pedestrian path to cross the Mass Pike heading north from Babcock Street, and since plans for Commonwealth Avenue call for the implementation of protected bike lanes, Babcock Street’s importance as a connector for bicycles will only grow in the future because it will provide a direct route between Brookline and Commonwealth Avenue, the projected West Station, and newly created parkland and bicycle paths along the Charles River. When Babcock Street is repaved, it should be made bicycle and pedestrian friendly for its entire length, with bike lanes/bike boxes where feasible, especially approaching the major intersections with Harvard Street and Commonwealth Avenue and with speed humps and raised crosswalks at strategic points along its length for traffic calming. For bicycle safety,

traffic calming is especially important at the points where lanes merge into shared travel lanes with sharrows.

Beacon Street at Charles Street: Traffic signal for left/U-turn from Beacon Street inbound to Beacon Street outbound is not triggered by a bicycle.

***Beacon Street outbound from Pleasant to Marion Street:** Design safe passage for bicycles from the end of the Beacon Street bike lane to start of bike lane at Marion Street.

Beacon Street outbound from Westbourne Terrace to Washington Square: Improve transition from the end of the bike lane near Westbourne Terrace to Washington Street intersection.

***Beacon Street Rush Hour Bicycle Lane (inbound)** via parking restrictions on sections of lower Beacon Street inbound. During the Beacon Street reconstruction project, there were parking restrictions on Beacon Street inbound. Restoring those restrictions during the morning rush hour period would effectively create a 7' wide bicycle lane to the right of the two lanes of motor vehicle traffic, thereby increasing safety and throughput for both cyclists and motorists. The no parking restriction would begin at Charles Street and continue to the strip of stores near St. Mary's Street. The area includes both residential and medical commercial buildings.

Bicycle Racks Additional bicycle racks are requested for Town Hall, particularly under the parking lot side of the overhang outside the entrance to provide some protection from weather; at some public schools; lower Beacon Street between Carlton and St. Mary's Streets on the inbound side of Beacon Street; Cypress/School/Washington business area; at parks throughout town that have few if any bicycle parking racks; Gibbs Street between Beals Street and Naples Road.

Brookline Avenue—Bike lanes or sharrows between Town line and Washington Street (Route 9) would continue lanes and sharrows already installed by Boston through the Longwood Medical Area and provide an important connection to the Emerald Necklace paths and Brookline Village.

Brookline Avenue Path repairs: The path running parallel to Brookline Avenue on the southeast side needs repair; tree roots, erosion, and other natural degradation has made this path dangerous for bicycles. This project could be incorporated into a larger effort to improve the Route 9 crossing and nearby paths; a wider path would reduce cyclist/pedestrian conflicts.

***Brookline Avenue crossing for Muddy River Path** at Parkway Road requiring new signals, signal synchronization, curb extension, curb ramps: The Muddy River Path is an attractive greenway for cyclists traveling between the Landmark Center and Jamaica Pond. Brookline Avenue bisects the path, and it is difficult to cross this four-lane road due to heavy traffic, physical barriers, and the lack of a dedicated crossing. This project requires a traffic signal installed at the intersection of Brookline Avenue and Parkway Road with a sequence tied to the signal at the corner of Aspinwall Ave and Brookline Ave. This would allow for cyclists on the southeast side of Brookline Ave to safely cross to the contraflow lane at Parkway Road. Additionally, a curb extension and ramps are necessary to allow bicycles to safely queue on the southeast side of Brookline Ave and to ascend onto the greenway. (In 2011, Brookline received a grant to proceed with planning of this and other connections for the Emerald Necklace.)

Carlton St. Footbridge: We support the repair and reopening of the Carlton St. Footbridge to provide a direct connection for cyclists and pedestrians between the Muddy River Path and Carlton St., including a safe crossing of Carlton St. at the footbridge site.

Centre Street bike and priority lanes: Centre Street runs parallel to Harvard Street, one block west. It provides a low traffic connection for cyclists to the farmers' market as well as the Coolidge Corner and JFK crossing commercial and residential districts. On the southern section of Centre Street this project would provide a bicycle lane southbound, and a bicycle priority lane northbound. Where road space allows, a dedicated bike lane would be painted in both directions.

Centre Street at Beacon: Traffic signal is not triggered by cyclists waiting to cross Beacon Street.

Chestnut Hill Avenue between Route 9 and Beacon Street at Cleveland Circle: Install bike lanes on both sides of the street. There is already a shoulder on both sides of the road. These should be widened sufficiently to be bicycle lanes. This could become a major route from South Brookline (extending the bike lanes on Lee/Clyde Streets) to Dean Road, Clinton Street and Beacon Street at Cleveland Circle.

Chestnut Hill Avenue at Clinton is a difficult crossing for cyclists and pedestrians, with poor sight lines. A median refuge is recommended to allow crossing half of Chestnut Hill Avenue at a time.

Chestnut Hill commercial district bike lanes and paths: This project helps to make the Chestnut Hill shopping area safer and more accessible for bicyclists. It takes advantage of the relative safety of both Middlesex Road on the north side of Route 9 and Heath Street on the south. The project involves creating bike lanes on Hammond Street from Middlesex Road to the shopping center and then extending a bike path through the shopping center connecting to the traffic light at Tully Street, thence to Heath Street and to and from Hammond Pond Parkway. Some of the bike path would be built as a sidewalk extension. Coordination with the City of Newton is essential. An additional accommodation could be to re-stripe the Hammond Street/Route 9 intersection to make it safer for bicyclists to go from Middlesex, across Route 9 to a right turn on Heath Street.

Davis Avenue at Cypress Street: Traffic signal is not triggered by cyclists waiting to cross Cypress Street.

Davis Avenue: Install bike lane from Cypress Street to Greenough Street to increase safety for cyclists going to and beyond the High School.

Dean Road from Clinton Street to Beacon Street would benefit from bike lanes or sharrows since this stretch provides an important connection between Beacon Street and routes to the Runkle School and the High School.

Essex Street crossing Dummer Street leads to the new and heavily used contraflow lane on Essex going through the Cottage Farm area. Despite signage, motorists are not aware that cyclists can go straight across Dummer, whereas motor traffic must turn right. Painting a green lane across the Dummer intersection and/or installing a raised intersection should help alert motorists to crossing bike traffic.

Gateway East is the area surrounding the intersection of Washington Street and Route 9, including Juniper Street, High Street and Pearl Street. See Route 9, Pearl Street and Walnut Street below for detailed recommendations for bicycle accommodations.

Goddard Avenue provides a direct connection between South Brookline and Boston at Jamaica Pond. In its present configuration, it is narrow and winding, but should reconstruction be possible in the future, it should be considered for bicycle accommodations, such as an off-road side path for bicyclists and pedestrians. In the meantime, sharrows and "no passing of bicycles" signs could improve safety for those cyclists who do use it.

Green Street: Stripe and sign Green Street for a contraflow lane for bicycles from Dwight Street to Harvard Street. This contraflow lane would replace the existing with-flow unmarked bike lane, which is not necessary because of the low traffic speed and volume. Because Green Street connects to the quiet streets north of it (Dwight St., Pleasant St., etc.), this contraflow lane is all that is needed to create a safe two-way route connecting the Boston University bridge area (access to Commonwealth Avenue, university areas, Cambridge and the Esplanade), as well as the dense Coolidge Corner Northeast residential area, to the bike lanes on Harvard Street (leading toward the center of Coolidge Corner, the Pierce School, town center and the high school). (Turned down by Transportation Board, 2012.)

Greenough Street at the High School: Create a separate shared path between the benches along Greenough Street in front of the High School and Cypress Field that would allow cyclists to travel from Sumner Road onto Greenough Street at Davis. This would require ramps at each end of the path and signage to make path use clear to all. This allows cyclists access to bike racks at the high school as well as a direct route past the high school to Washington Street (and Washington Square) and Park Street (to Coolidge Corner).

Grove Street: Bike lanes in both directions between Newton Street and Putterham Circle.

Grove Street and Allandale Road: Traffic signal should include a protected/dedicated left turn from Grove to Allandale. Vehicles coming inbound from Putterham Circle come very fast over a rise, making the left turn dangerous for both cyclists and vehicles.

***Hammond Street Greenway:** Create a green street to enhance commuter and recreational cycling through South Brookline, connecting West Roxbury Parkway with Boylston and Beacon Streets. Use a road diet for Hammond between the rotary and Route 9 for one lane in each direction (except at Route 9 junction). Install median refuge at Woodland Road to allow safe crossing and access to Woodland Road for pedestrians and cyclists

Hammond Pond Parkway multi-use path would provide Newton-West Roxbury connection and recreational access to Brookline parks and conservation areas. Install multi-use path along the entire length of the Parkway, with connection to Skyline Park.

Harvard Street: Incorporate recommendations of the “Bicycle and Pedestrian Infrastructure Assessments, Brookline, MA Harvard Street Corridor: Longwood Avenue to Shailer Street” (see Appendix C.) This report was prepared through the cooperation of the Massachusetts Department of Transportation, Walk Boston and Mass Bike. Its goal was to study this section of Coolidge Corner and make recommendations to improve pedestrian and bicyclist safety and convenience.

Harvard Street: Upgrade bicycle facilities to protect cyclists better from moving motor vehicles and the door zone of parked cars. Some specific short-term improvements include: (a) Increase width of bike lanes to at least 5 feet wherever possible. (b) Make bike lanes continuous for the length of Harvard Street, e.g., northbound in front of Devotion School through Beals Street intersection. (c) Southbound approaching Babcock Street, provide advance stop area for left turn onto Babcock. (d) Provide left turn bike boxes to facilitate bicycle left turns from Beacon onto Harvard. (e) Southbound at Beacon Street provide advance stop area in both lanes; with markings on street, encourage cyclists who will turn left at Longwood to stay in left lane and after Beacon Street provide angled sharrows for left turn onto Longwood. (f) Both directions at Aspinwall Avenue/School Street intersection, provide sharrows for left turns and advance stop areas. (g) Southbound at Washington Street, provide bike lane through the merge onto Washington Street.

Harvard Street at Babcock Street: The left turn signal from Harvard Street southbound to Babcock Street is not triggered by a bicycle.

***Heath Street passing restrictions:** Heath Street runs east/west roughly parallel to Route 9 from the Brookline Reservoir to the Newton Town Line. As such, it's a very attractive route for cyclists commuting, seeking recreation, or shopping. Heath Street's width makes passing impossible without crossing substantially into oncoming traffic or without coming dangerously close to cyclists. This project calls for signage to prohibit motorists from passing bicycles between Warren and Hammond.

Independence Drive: Bike lanes in both directions between Putterham Circle and Town line to improve safe access to Baker School.

Ivy Street: Extend contraflow lane to the block between Carlton Street and St. Mary's Street. This extends a connection on quiet neighborhood streets to and from Audubon Circle, Beacon Street and the Fenway area.

***Lee/Clyde segment of South Brookline Greenway:** A major project could create a "greenway" by moving motorized traffic to the west side (one lane in each direction) and constructing a mixed-use path and service road on the east side.

Longwood Avenue toward Longwood Medical Area--left turn onto Chapel Street: The left turn from Longwood Avenue southbound onto Chapel Street (toward the Longwood T-stop, the ramp to the Muddy River path and Longwood Towers) is both heavily used and difficult for both cyclists and motorists because traffic moves steadily on Longwood from the Longwood Medical Area. Although there is a light at this intersection, left turning traffic has no opportunity for a protected turn. Cyclists waiting to turn have moving traffic on both sides of them. It would be beneficial to have an option to allow bicycles and vehicles queued at the light to turn left without oncoming traffic at the beginning of the light cycle.

Middlesex Road bike lanes: Middlesex Road is an important link for travel to and from the Chestnut Hill commercial district. This plan has three essential parts. First, it calls for a contraflow lane from Circuit Road to Reservoir Road. Second, it calls for bicycle priority lanes between Hammond Street and Circuit Road. Third, it calls for a curb ramp to access the Reservoir Road Bridge from the reservoir side over the D line. Because the Hammond Street end is in Newton, we need to coordinate with that city.

Naples Road: Bike lane on north side but *without* a double yellow center line; absence of a center line has been shown to slow traffic.

Netherlands Road: Safe crossing from Parkway contraflow lane to Muddy River Path.

***Newton Street, Goddard Circle to Town line:** Install bike lanes in both directions on this wide street with fast moving traffic to connect to the Newton Street entrance to Larz Anderson Park and to Boston (Jamaica Pond area)

***Newton Street Greenway** will improve conditions for commuter and recreational riders traversing South Brookline around the Country Club and Putterham Golf Course between Brookline, Newton and West Roxbury. Install roadside bike paths on both sides of Newton Street from Clyde/Newton intersection to West Roxbury Parkway. Provide safe crossing of Newton Street at South Street with either a median refuge for cyclists and pedestrians and/or traffic signal to allow safe access to Putterham Circle,

Independence Drive and VFW Parkway. Install bike lanes (preferably protected bike lanes) in both directions between Clyde Street and Putterham Circle.

***Park Street** priority lanes north and south on Park Street between Marion and Washington. Park Street connects North Brookline to Brookline High School, the Kिरrane Aquatic Center and the rest of the Brookline Hills area and is a quieter alternative to cycling on Harvard Street.

Pearl Street: reduce the posted speed limit to 15 mph; mark travel lanes with sharrows; install bicycle boxes at the intersections with Washington St. and Brookline Ave. to facilitate left hand turns; and eliminate parking along the street near the Washington St. intersection. Parking for cars along the street should be either parallel to the street or, if at angle, be back-in.

Pleasant Street is shown as a “connector route” for the network. For the present, this seems sufficient EXCEPT for the last block from John Street to Beacon Street where bicycle markings would help clarify road use for both bicycles and motorists as they approach this difficult Coolidge Corner intersection.

Route 9 Crossing at Chestnut Hill Avenue: Improve bicycle use and safety in this intersection by adding lanes connecting Chestnut Hill Avenue, Heath Street, and Lee Street.

Route 9 north side from Town Line to Brookline Avenue: Provide safe pedestrian and off road cycle track to connect Muddy River path along River Road and the Route 9 Emerald Necklace crossing to Brookline Avenue and the eventual cycle track to Washington Street.

***Route 9 cycle tracks from Washington Street to Pond Ave:** The Gateway East project will bring Walnut Street one block closer to the Muddy River, and provide a safe crossing at Walnut/Pearl. This project will link Walnut Street to the Muddy River paths, completing the connection from the Brookline Reservoir to the Muddy River. The preferred layout is a pair of one-way cycle tracks (bike paths) at sidewalk level, one on each side of Route 9, from Pond Street to Walnut Street.

Route 9, Washington/High Street intersection to Cypress and beyond: Continue the cycle tracks planned for Gateway East (as described above) to facilitate safe bicycle travel along the developing corridor and beyond toward Chestnut Hill.

***Route 9 grade-separated crossing for Muddy River Path:** Even if an at-grade crossing of Route 9 is provided for the Muddy River path, a grade-separated crossing using the existing highway bridge is a useful option to consider. Project elements include: (a) Re-deck the existing highway bridge carrying the Riverway/Jamaicaway over Route 9, shifting travel lanes in order to create a barrier-separated two-way shared-use path along the western edge of the bridge. (b) South of the bridge, regrade the southwest island and build a path that winds down from the bridge to the existing crosswalk that crosses the on-off ramp and leads to the existing paths around Leverett Pond. (c) Reconfigure the junction of River Rd with Riverway, closing the off-ramp (creating more green space) and having the on-ramp meet Riverway at 90 degrees. (d) North of the bridge, this path will have no direct access to Route 9. Continue it from the bridge as a barrier-separated path within space now occupied by the highway, curving it away from the highway onto the existing bridge over the Muddy River, and then curving it back again to cross the on-ramp from River Road to Riverway. A Northeastern University senior design project details the design and shows it to be feasible and cost-effective. There is a \$600,000 federal earmark for this path crossing. Various parts of this route are controlled by different governmental entities, and cooperation would be necessary to plan and construct this project. This link is also very important to Boston’s bicycle program.

Stedman Street: Provide a safe contraflow from Harvard Street towards Gibbs Street, taking into account the entire right of way width. This might be accomplished by a protected contraflow bicycle track, by a multi-use path for both cyclists and pedestrians or some other means. This is important for the safety of students using bicycles to travel to and from school because without a safe way of moving from the school into the neighborhood to the north and east, they would be required to bike to Harvard Street and interact with the busy traffic there.

Stedman Street at Harvard Street: Traffic signal is not triggered by a bicycle.

Sumner at Route 9: Traffic signal is not triggered by a bicycle.

Tappan Street at Cypress Street: Traffic signal for turns from Tappan Street onto Cypress Street is not triggered by a bicycle.

Tappan Street: Install bike lane from Greenough Street to Cypress Street to improve safety for cyclists around the High School.

Walnut Street at Route 9: Traffic signal is not triggered by a bicycle

Walnut Street safety improvements: Install additional but gentler speed humps or raised crosswalks along Walnut Street to slow vehicular traffic. Install bike priority lane markings

Walnut/Juniper Streets as reconfigured at Route 9 should include bicycle lanes in both directions.

Washington Street from Beacon Street to Harvard Street: When repaved, install continuous bike lanes on Washington from Beacon Street to Harvard Street in both directions, with a protected cycle track in at least one direction and substantial improvements at the half dozen T-intersections to improve both cyclist and pedestrian safety. Remove the little-used parking on the eastbound (downhill) side wherever necessary to allow for the continuous bike lane/track, while also recognizing the daily on-sidewalk parking by residents on the south side of Washington between Park and Gardner, which creates a pedestrian hazard. This is an important route to the high school, main library and town center.

Washington Street from Station Street to Route 9: Install bike lanes or protected bike lanes on east side to connect with bicycle accommodations at Gateway East.

Washington Street southbound, protected left turn to Station Street: The left turn from Washington Street southbound onto Station Street is both heavily used and difficult for both cyclists and motorists because traffic on Washington Street northbound crests a hill while coming around a bend. Although there is a light at this intersection, left turning traffic cannot see when the northbound traffic has a red and when it is therefore safe to turn. A protected left turn would increase safety at this busy intersection that provides access to the Brookline Village T Station (with its Hubway station), to Kent Street, Aspinwall and beyond.

Webster Street at Beacon Street: Traffic signal to cross Beacon Street between Webster and Centre Streets is not triggered by a bicycle.

***West Roxbury Parkway Greenway (along Putterham Golf Course):** A major project would create a “greenway” by moving motorized traffic to the west side (one lane in each direction) and constructing a mixed-use path and service road on east side in multi-lane sections of West Roxbury Parkway and Newton St. Bike lanes should be established on the rest of West Roxbury Parkway. Intersections will need to be redesigned.

Willow Pond Road: Bicycle accommodations (lanes or sharrows, signage) to make a safe connection through Olmsted Park, connecting bike paths on the two sides of the park. (Would require cooperation with Massachusetts Department of Conservations and Recreation and with Boston since the road crosses the town border.)

Winchester Street: Bicycle safety improvements will enhance the connection between Coolidge Corner and Brighton. Install additional but gentler speed humps along Winchester Street to slow vehicular traffic. Install bike lanes and bike priority lanes as space permits in compliance with contemporary design guidelines.

8. Projects Approved/Awaiting Funding

9. Projects Funded/Awaiting Construction

Clyde Street at Lee Street: Transportation Board approved narrowing intersection to improve pedestrian safety and vehicle turns onto Lee and Clyde. A dedicated, protected slip lane for cyclists turning right where Clyde turns south will be installed. (*Construction started, Fall 2016*)

Greenough Street between Washington Street and Lowell Street: Sharrows in both directions; new extended curb on NW corner to slow traffic; extended curbs on NW and SE of Greenough and Stanton Road to tighten turns and decrease length of pedestrian crossing. (Approved by Transportation Board, June 2015)

Newton Street between Horace James Circle and Skyline Drive: Bike lane on both sides of street to provide safer access between the Circle and Skyline Drive leading to Skyline Park and the transfer station. (Approved by Transportation Board, June 2015)

River Road/Muddy River Path: Along River Road, the Muddy River path is nothing but a narrow informal dirt track worn into the grass. This section of path on the Brookline side of the river should be restored. This project involves narrowing River Road and widening the park area between the road and the flood wall to construct a path in that narrowed section (asphalt paving). (Scheduled for Spring 2016. Some of path completed, fall 2016)

St. Mary's Street: Stripe and sign for a contraflow lane for bicycles from Mountfort Street to Commonwealth Ave. upon completion of St. Mary's Street bridge project. MassDOT has included with flow and contraflow bike lane striping on the St. Mary's Street bridge. *Postponed pending construction by Mass DOT*

10. Completed Projects

The following projects have been completed. As conditions change and engineering practice advances, additional improvements will be warranted for many Brookline streets. For example, consideration can be given to replacing bicycle lanes with cycle tracks or protected lanes.

Aspinwall Avenue from Washington to St. Paul: Bike lanes and sharrows. *Completed, Summer 2014.*

Beacon Street outbound from Marion St. to Westbourne Terrace: Buffered bike lane installed 11/14/16 for a one-year trial.

Beacon Street extension of bike lane inbound from the traffic signal at Winchester Street to Webster Street: A bike box at Webster facilitates cyclists' left turns from Beacon onto Center Street. *Completed Fall 2015*

Beacon Street priority lanes: Bicycle lanes are *not* continuous along the entire length of Beacon Street within Brookline, and this creates a serious hazard for cyclists and uncertainty among cyclists and motorists on sharing the road. Bicycle priority lanes provide a minimal connection of the bike lane segments. (Approved by Transportation Board, January 3, 2013; funding approved for 2014 construction; completed summer 2015)

Chapel/Colchester/Carlton/Ivy/Essex Street bike lanes: This is a major commuting and recreational route for Brookline residents and others cycling between Cambridge and the Muddy River and Longwood Medical Area in Boston includes bike lanes and priority lanes from Longwood and Chapel to Essex and Dummer via Carlton Street, Ivy and Essex. *Completed, Summer 2013*

Chapel Street at Longwood: There is a bike box to facilitate cyclists' left turns from Chapel Street to Longwood Avenue; a camera has been added to the traffic signal to change the light for cyclists. *Completed, 2014.*

Clark Road bicycle priority lanes: Marked for bicycle priority lanes in both directions.

Cypress Street bike lanes: Cypress is a major route across Brookline between Brookline Village and Jamaica Pond/Jamaica Plain, also connecting the Main Library, Pierce School, Lincoln School and the High School. Bike lanes/priority lanes installed: **South Cypress** from Paul Pender Circle along Chestnut, High and Cypress to Boylston Street (2011-12) *Completed, Summer 2013* **North Cypress Street** from Boylston Street to Washington Street *Completed Summer 2014.*

Dudley Street: Striped and signed (along the south side of the Brookline Reservoir) as a contraflow lane for bicycles (from Lee Street to Warren Street). *Completed, Summer 2013*

Essex to Commonwealth connector - Curb Ramps, Paint, and Signage: allow northbound bicycles to get to the southeast corner of Mountfort St and Commonwealth Avenue, which then allows them to turn right onto the bicycle lane at Commonwealth Ave or proceed north to the bicycle lanes on the BU Bridge. *Completed, Summer 2013*

Goddard Avenue from Newton Street to Avon Street: Bike lanes on south side of Goddard Avenue from Newton Street along Larz Anderson Park, and bike lanes/sharrows on north side of Goddard Avenue to Clyde. *Approved by Transportation Board, December 2014; completed fall 2015*

Greenough Street: "Except bicycles" sign added to the "do not enter 9 AM to 4 PM school days only September 1 to July 1" restriction on Greenough Street in front of Brookline high School.

Harvard Street bike lanes/sharrows to bring Harvard Street (School to Beacon) into compliance with contemporary designs and to complete the bike lane from Beacon to the town line with Allston. *Completed, Summer 2013*

Harvard Street at Washington (Brookline Village): “Except bicycles” sign added to the “no right turn” restriction at the intersection of Harvard Street at Washington Street.

Longwood Avenue dedicated bicycle lane eastbound, bicycle priority lane westbound, Harvard Street to Town Line at Muddy River—*completed 2010 and 2013*

Netherlands Road contraflow lane from Parkway to Aspinwall—*completed 2009*

Newton Street from Clyde to Goddard Avenue: Bike lanes on both sides of Newton Street between Clyde and Goddard, including bollards along the south side and a bike box at Goddard Circle to provide safe waiting space for crossing to Goddard Avenue. Bike left turn lane from Clyde to Goddard to the right of turning vehicles. *Approved by Transportation Board, December 2014; completed Fall 2015*

Park Street contraflow (Marion Street to Beacon Street): Stripe and sign Park Street as a contraflow lane for bicycles from Marion to Beacon. This would allow safer access for bicyclists into Coolidge Corner. At present, some cyclists go the wrong way on Park without the safety of striping or signage, or if traveling along Park, must go right on Vernon Street, make a difficult left onto Harvard, and then travel in a heavily trafficked area of Harvard Street to reach Coolidge Corner. *Completed, Summer 2013*

Parkway Road contraflow lane from Brookline Avenue to Netherlands Road—*completed 2009*

Route 9 Crossing for Muddy River Path (at grade): A safe crossing for cyclists and pedestrians to connect two parts of the Emerald Necklace—the Muddy River Path and the paths around Leverett Pond leading to Jamaica Pond. Curbs reconfigured, median widened traffic signal installed. *Completed Fall 2016*

School Street Repaving from the public parking lot to Washington St. to remove dangerous hump in the street parallel to the curb—*completed 2012*

School Street bike/priority lanes from Washington Street to Harvard Street extend the Cypress Street bike lanes to connect with Harvard Street bike lanes to Coolidge Corner and Brookline Village. *Completed Summer 2014*

St. Paul Street from Aspinwall Avenue to Beacon Street: Bike lane on northbound side; sharrows on southbound side—*completed 2014.*

St. Paul Street from Beacon Street to Commonwealth Avenue: Bike lane on northbound side; sharrows on southbound side Approved by the Transportation Board (*December 2014*); *scheduled for 2015-16; completed Fall 2015*)

Sumner Street from Buckminster to Route 9: Bike lane and shared vehicular right turn with through bike lane at Route 9, *completed 2014.*

Washington Street bike lanes and sharrows from Davis to School and Cypress Streets—*completed 2010*

Washington Street: Bicycle lanes and sharrows from School and Cypress Streets to the town line near Corey Road. *Completed, Summer 2013*

Appendices

Appendix A: Green Routes Network Map, showing bicycle accommodations completed by type and proposed future work.

Appendix B: Brookline's Report Card from the Leagues of American Bicyclists

Appendix C: Harvard Street Safety Recommendations from Mass DOT Report, 2016

References

"Brookline Complete Streets Policy" adopted by the Board of Selectmen (May 17, 2016).

Federal Highway Administration, *Manual on Uniform Traffic Control Devices (MUTCD)*.

League of American Bicyclists, Bronze Level Report Card for Brookline (Spring 2016; see Appendix B).

National Association of City Transportation Officials, *NACTO Urban Bikeway Design Guide* (<http://nacto.org/cities-for-cycling/design-guide/>)

John Pucher and Ralph Buehler, editors, *City Cycling* (Cambridge, MA: MIT Press, 2012).

Massachusetts Department of Transportation, *Bicycle and Pedestrian Infrastructure Assessments, Brookline, MA, Harvard Street Corridor: Longwood Avenue to Shailer Street* (16 August 2016). See Appendix C.

Massachusetts Department of Transportation, *Separated Bike Lane Planning Design Guide* (2015) (<https://www.massdot.state.ma.us/highway/DoingBusinessWithUs/ManualsPublicationsForms/SeparatedBikeLanePlanningDesignGuide.aspx>)



BROOKLINE, MA

TOTAL POPULATION

58,732

TOTAL AREA (sq. miles)

6.8

POPULATION DENSITY

8637

OF LOCAL BICYCLE FRIENDLY BUSINESSES

0

OF LOCAL BICYCLE FRIENDLY UNIVERSITIES

0

10 BUILDING BLOCKS OF A BICYCLE FRIENDLY COMMUNITY

Average Silver Brookline

Arterial and Major Collector Streets with Bike Lanes	45%	29%
Total Bicycle Network Mileage to Total Road Network Mileage	30%	11%
Public Education Outreach	GOOD	SOME
Share of Transportation Budget Spent on Bicycling	7%	5.8%
Bike Month and Bike to Work Events	GOOD	SOME
Active Bicycle Advocacy Group	ACTIVE	YES
Active Bicycle Advisory Committee	ACTIVE	MONTHLY
Bicycle-Friendly Laws & Ordinances	SOME	SOME
Bike Plan is Current and is Being Implemented	YES	YES
Bike Program Staff to Population	1 PER 70K	1 PER 293,660

CATEGORY SCORES

ENGINEERING <i>Bicycle network and connectivity</i>	2 / 10
EDUCATION <i>Motorist awareness and bicycling skills</i>	1 / 10
ENCOURAGEMENT <i>Mainstreaming bicycling culture</i>	1 / 10
ENFORCEMENT <i>Promoting safety and protecting bicyclists' rights</i>	4 / 10
EVALUATION & PLANNING <i>Setting targets and having a plan</i>	2 / 10

KEY OUTCOMES

Average Silver Brookline

RIDERSHIP <i>Percentage of Commuters who bike</i>	3.5%	4.1%
SAFETY MEASURES CRASHES <i>Crashes per 10k bicycle commuters</i>	180	444
SAFETY MEASURES FATALITIES <i>Fatalities per 10k bicycle commuters</i>	1.4	1.6

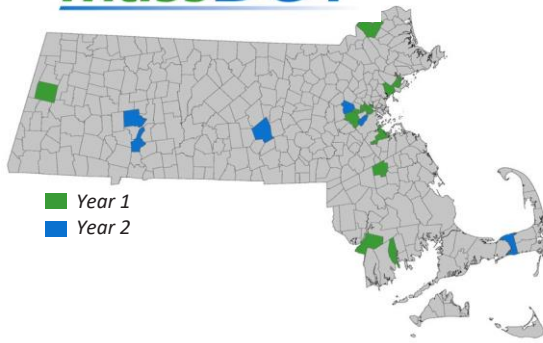


- » Hire a Bicycle Program Manager to ensure that developments and projects incorporate bicycle facilities, assess impacts of bicycle facilities and programming, and implement your bike plan.
- » Leverage your proximity to Boston to bring more education and encouragement activities currently taking place in Boston to the Brookline area. Adult bicycle education in particular could be improved.
- » Complete and expand upon the network of Green Routes to provide safe and accessible bicycle routes for riders of all ages and abilities. To provide a connected network, use a variety of tools from the NACTO Guide to address issues of limited right of way and a lack of street grid connectivity.

- » Continue work to develop and implement a Traffic Demand Management Plan that will expand end-of-trip facilities and ensure that developments benefit people who bike and walk.

- » Develop a Complete Streets policy. This means that every transportation project will make the street network better and safer for drivers, transit users, pedestrians, and bicyclists - making your community a more desirable place to live and do business.

- » Install a bicycle wayfinding system with distance and destination information at strategic locations around the community, integrating preferred on street routes and off-street facilities.



Bicycle and Pedestrian Infrastructure Assessments Brookline, MA

Harvard Street Corridor: Longwood Avenue to Shailer Street

Brookline is one of 18 communities participating in the MassDOT multi-disciplinary program to improve bicycle and pedestrian safety in Massachusetts. One of the components of the MassDOT program is to conduct walk and bike assessments that identify infrastructure challenges to walking and biking and recommend short- and long-term improvements. These assessments are also a means of building local knowledge of the importance of well-designed pedestrian and bicycle facilities. WalkBoston and MassBike conducted an assessment of Harvard Street in Brookline, MA.

Corridor-wide Recommendations

Short-term Recommendations:

1. Conduct a traffic analysis of the corridor and surrounding street network for potential mitigation of traffic flow along the corridor.
2. Reduce pedestrian tripping hazards by replacing sidewalk panels and further implementing the Town's pervious tree grate program.
3. Develop strategies to improve the quality and health of street trees, such as installation of permeable pavement.
4. Identify citizen or business sponsors to install, program, and maintain parklets in high pedestrian area.
5. Add bicycle left-turn queue boxes, where feasible.
6. Modify the "WALK YOUR BIKE" signs or rotate the signs to clarify the circumstances in which bicyclists should walk their bikes.
7. Install additional bike parking or on-street bike corrals in convenient and visible locations throughout the study area.

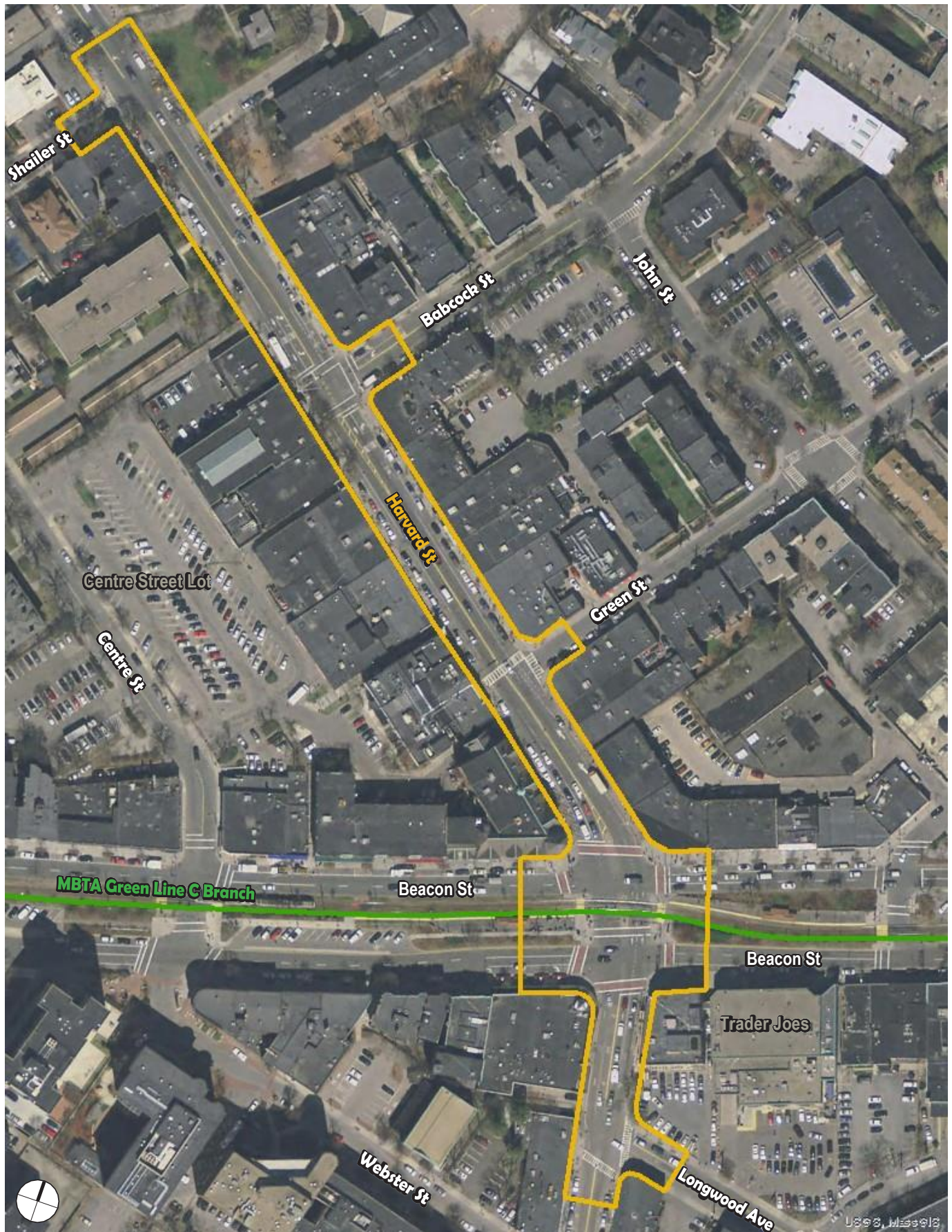
8. Install pedestrian countdown indications at signalized intersections.
9. Review or reevaluate far-side bus stops to replace existing near side bus stops.

Long-term Recommendations:

10. Provide continuous separated bike lanes or bike lanes throughout the study area by conducting further analysis on the potential to narrow travel lanes, remove travel lanes, or remove parking
11. Further study feasibility of relocating on-street parking north of Beacon Street to Centre Street parking lot to provide wider sidewalks and high quality bicycle facilities.
12. Provide bicycle facilities on nearby Centre Street, Winchester Street, and Park Street which may provide an alternate route for bicyclists routing around Coolidge Corner.
13. Reconstruct curb ramps to meet accessibility standards.
14. Shorten crosswalks with curb extensions or pedestrian crossing islands where such treatments would not interfere with current or future bicycle facilities.



Assessment Area



Intersection Recommendations



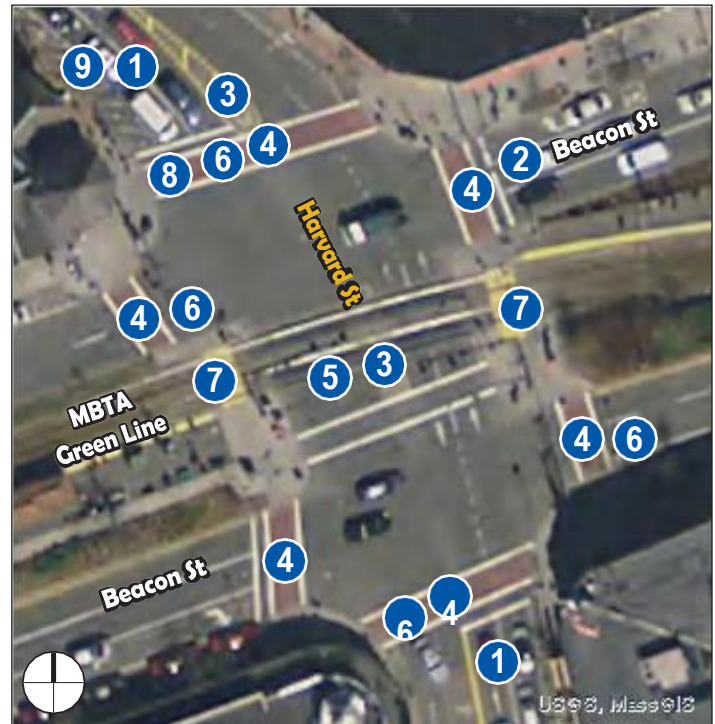
Harvard St at Longwood Ave

Short-term:

1. Further study the potential to signalize the intersection and coordinate with the intersection of Beacon Street.
2. Add 'Don't Block the Box' markings and signs that conform to the latest version of the MUTCD.
3. Restrict left turns from Longwood Avenue onto Harvard Street southbound.
4. Further evaluate the intersection of Harvard Street/Sewall Avenue for an increase in left turning vehicles.
5. Install in-street warning signs on the Harvard Street and Longwood Avenue crosswalks.
6. Widen bicycle lane by reducing width of travel lanes and install flexposts.
7. Remove warning signs and replace with a bike lane sign.

Long-term:

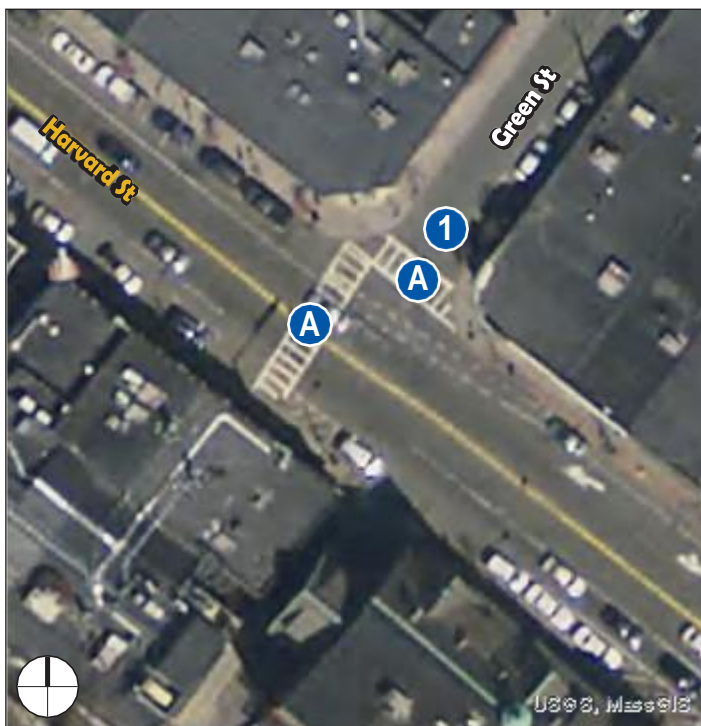
- A. Shorten crosswalks with curb extensions or pedestrian crossing islands where such treatments would not interfere with current or future bicycle facilities.



Harvard St at Beacon St

Short-term:

1. Reduce width of travel lanes to provide continuous bike lanes.
2. Reallocate the space for bicycle facilities for the Beacon Street westbound approach.
3. Remove the two existing small medians and reallocate space to other users.
4. Replace the existing crosswalks with high visibility ladder style crosswalks.
5. Further study the feasibility of providing one stage crossings across Beacon Street.
6. Extend leading pedestrian intervals.
7. Maximize pedestrian crossing times for all approaches.
8. Install bicycle box for the Harvard Street southbound approach to Beacon Street.
9. Install wayfinding signage on southbound Harvard Street north of Beacon Street to inform drivers of the need to position for a left turn onto Longwood Avenue prior to Beacon Street.



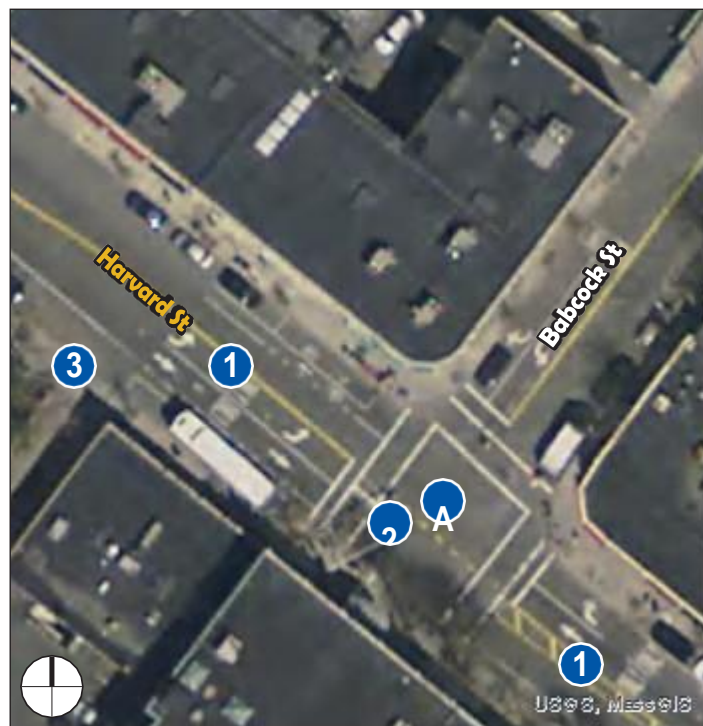
Harvard St at Green St

Short-term:

1. Evaluate adding contraflow bicycle lane on Green Street and potential intersection improvements at Harvard Street and Green Street.

Long-term:

- A. Shorten crosswalks with curb extensions or pedestrian crossing islands where such treatments would not interfere with current or future bicycle facilities.



Harvard St at Babcock St

Short-term:

1. Adjust pavement markings to provide a minimum of a 5-foot bike lane by narrowing the travel or parking lane.
2. Modify signal to lagging left-turn instead of leading left turns to allow people waiting to cross first.
3. Close exit driveway from Centre Street parking lot or restrict parking by removing adjacent parking meters, adding no parking pavement markings, and adding no parking signs.

Long-term:

- A. Coordinate intersection improvements with the selected Babcock Street alternative.